

Interactive comment on “Sensitivity of the grassland-forest ecotone in East African open woodland savannah to historical rainfall variation” by I. Ssemmanda et al.

Anonymous Referee #2

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The paper by Ssemmanda et al uses a 200-years, high resolution pollen record from Lake Chibwera , SW Uganda) to assess the sensitivity of grassland-forest ecotones to historical rainfall variations. The study is supported by analyses of modern pollen rain spectra along a vegetation (and rainfall) gradient to “calibrate” the fossil record. The paper is generally well written and shows potentially very interesting results. However, the presentation is too descriptive and further analyses of data are required to answer the proposed research questions. The study lacks a systematic and robust approach to “calibrate” modern pollen rain and to numerically compare the fossil pollen record with historical rainfall data. I feel that the authors miss the opportunity to address a range of very interesting questions (e.g. leads and lags in vegetation response, indicator taxa,

C595

pollen production, change in biodiversity) which would make this paper also interesting to a wider scientific community.

Specific comments:

- a) The abstract discusses changes in diversity and pollen influx although these data are not shown in the paper. Pollen influx diagrams should be presented and discussed.
- b) The description of the study area and sampling sites for modern pollen rain is very general. It would be helpful to have a better description of vegetation (gradient!), human impact and abiotic factors (rainfall gradient!) for each site, including a more detailed map.
- c) One aim of this study is to use modern pollen rain for “calibration”. Section 4.1 provides a description of the spectra – but where is the calibration? At least multivariate statistics should be used to identify key environmental controls.
- d) Regular burning is quoted in section 2.2 as a major environmental factor. It would be very interesting to see charcoal counts for both modern and fossil samples.
- e) Reference for FAO (2005) missing.
- f) Please indicate sampling resolution of pollen record
- g) Age control is crucial for the understanding and interpretation of palynological results. The discussion mentions dating uncertainties. Please provide a full age model and description, even if it is already published elsewhere.
- h) It is not clear how the dry and wet periods (shown in Fig 4) have been derived from data in Fig. 2. Please explain.
- i) The comparison of well dated, high resolution pollen and rainfall data could be more accurate. I do not agree that the pollen zones correlate with previously identified wet and dry periods. In fact, the boundaries do not match and the leads and lags need to be discussed in more detail. If mismatches are only caused by dating uncertainties (as

C596

mentioned in the discussion) the age model maybe not good enough for this study.

j) Statistical tests are needed to further analyse and compare the fossil pollen record.

k) The discussion could be improved. It is not clear in how far the identification of pollen source and PFT's contributes to the aim of this study.

Interactive comment on Clim. Past Discuss., 10, 1675, 2014.